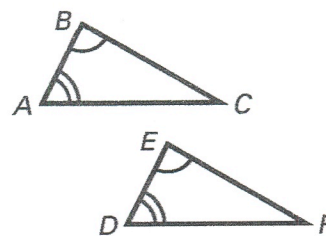


THEOREM 4.3: THIRD ANGLES THEOREM

If two angles of one triangle are congruent to two angles of another triangle, then the third angles are also congruent.

If $\angle A \cong \angle D$ and $\angle B \cong \angle E$,
then _____.



Example 3 Using the Third Angles Theorem

Find the value of x .

Solution

In the diagram, $\angle V \cong \angle Y$ and

$\angle U \cong \angle Z$. From the Third Angles

Theorem, you know that $\angle W \cong \angle X$.

So, $m\angle W = m\angle X$. From the Triangle Sum

Theorem, $m\angle W = 180^\circ - 54^\circ - 67^\circ = \underline{\hspace{1cm}}^\circ$.

$$m\angle W = m\angle X$$

Third Angles Theorem

$$\underline{\hspace{1cm}}^\circ = (4x - 5)^\circ$$

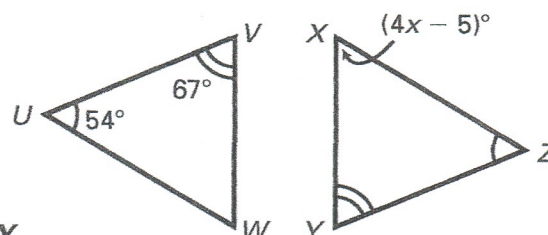
Substitute.

$$\underline{\hspace{1cm}} = 4x$$

Add $\underline{\hspace{1cm}}$ to each side.

$$\underline{\hspace{1cm}} = x$$

Divide each side by $\underline{\hspace{1cm}}$.



Look for:

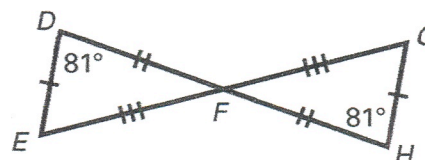
① vertical angles

② reflexive side or shared side

③ third angles

Example 4 Determining Whether Triangles are Congruent

Decide whether the triangles are congruent. Justify your reasoning.



Solution

Paragraph Proof From the diagram, you are given that all three pairs of corresponding sides are congruent.

$$DE \cong \underline{\hspace{1cm}}, \underline{\hspace{1cm}} \cong GF, DF \cong \underline{\hspace{1cm}}$$

Because $\angle D$ and $\angle H$ have the same measure, $\angle D \cong \angle H$. By the Vertical Angles Theorem, you know that _____.

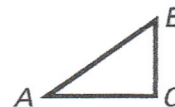
By the Third Angles Theorem, _____.

Answer So, all three pairs of corresponding sides and all three pairs of corresponding angles are _____. By the definition of congruent triangles, _____.

THEOREM 4.4: PROPERTIES OF CONGRUENT TRIANGLES

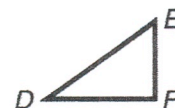
Reflexive Property of Congruent Triangles

Every triangle is congruent to _____.



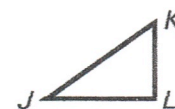
Symmetric Property of Congruent Triangles

If $\triangle ABC \cong \triangle DEF$, then _____.



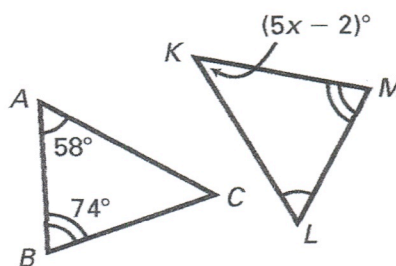
Transitive Property of Congruent Triangles

If $\triangle ABC \cong \triangle DEF$ and $\triangle DEF \cong \triangle JKL$, then _____.



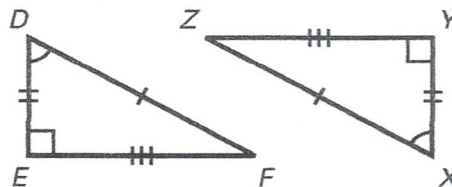
✓ **Checkpoint** Complete the following exercises.

1. Find the value of x .



$$\angle K \cong \angle C$$

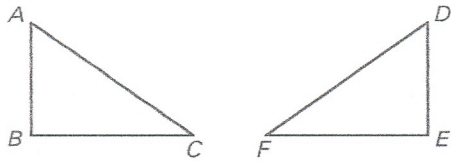
2. Decide whether the triangles are congruent. Justify your reasoning.



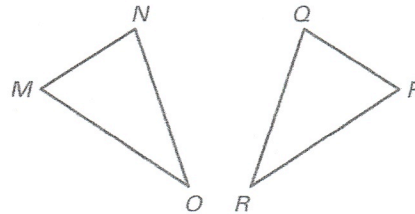
Practice A

For use with pages 202-210

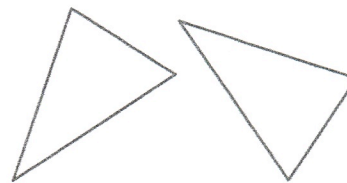
1. Given $\triangle ABC \cong \triangle DEF$, name three pairs of congruent sides.



2. Given $\triangle MNO \cong \triangle PQR$, name three pairs of congruent angles.

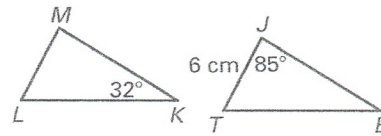


3. Copy the congruent triangles shown at the right. Then label the vertices of your triangles so that $\triangle RUV \cong \triangle TNF$. Identify all pairs of congruent corresponding angles and corresponding sides.



In the diagram, $\triangle MKL \cong \triangle JET$. Complete the statement.

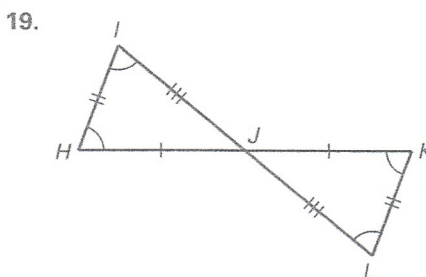
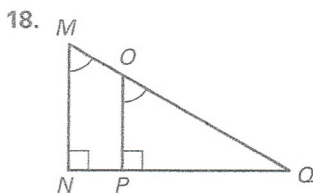
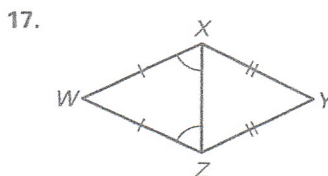
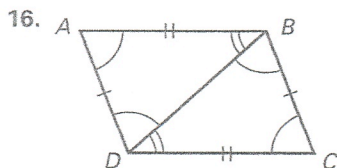
4. $\angle L \cong$ _____
 5. $\overline{MK} \cong$ _____
 6. $m\angle M =$ _____
 7. $m\angle T =$ _____
 8. $ML =$ _____
 9. $\triangle ETJ \cong$ _____



Complete this statement.

10. If $\triangle WRD \cong \triangle PLK$, then $\overline{WR} \cong$ _____.
 11. If $\triangle BGT \cong \triangle DSN$, then $\angle T \cong$ _____.
 12. If $\triangle SVP \cong \triangle MTQ$, then $\overline{PS} \cong$ _____.
 13. If $\triangle JCX \cong \triangle MWP$, then $\overline{XC} \cong$ _____.
 14. If $\triangle RHK \cong \triangle WVO$, then $\triangle KRH \cong$ _____.
 15. If $\triangle PMC \cong \triangle LDX$, then $\angle M \cong$ _____.

Identify any figures that can be proved congruent. Explain your reasoning. For those that can be proved congruent, write a congruence statement.

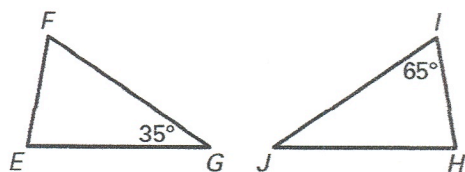


TEST TAKING STRATEGY One of the best ways to prepare for the SAT is to keep up with your regular studies and do your homework.

1. **Multiple Choice** If $\triangle ABC \cong \triangle XYZ$, which of the following statements below is *not* true?

- (A) $\angle B \cong \angle Y$ (B) $\overline{AB} \cong \overline{XY}$
 (C) $\angle CBA \cong \angle ZXY$ (D) $\overline{AC} \cong \overline{XZ}$
 (E) $\angle BAC \cong \angle YXZ$

2. **Multiple Choice** In the diagram, $\triangle EFG \cong \triangle HIJ$. What is the measure of $\angle H$?

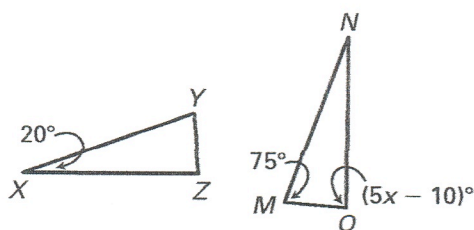


- (A) 35° (B) 65° (C) 70°
 (D) 80° (E) Cannot be determined

3. **Multiple Choice** In the diagram in Exercise 2, $EG = ?$.

- (A) HI (B) HJ (C) JI
 (D) FG (E) Cannot be determined

4. **Multiple Choice** Given $\angle X \cong \angle N$ and $\angle Z \cong \angle O$, find the value of x .

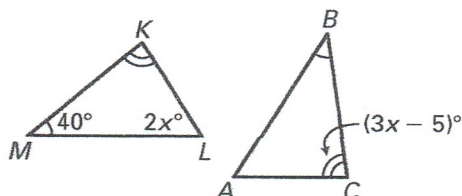


- (A) 19 (B) 38 (C) 95
 (D) 85 (E) 20

5. **Multiple Choice** Use the diagram in Exercise 4 to find $m\angle Z$.

- (A) 19° (B) 38° (C) 95°
 (D) 85° (E) 20°

6. **Multiple Choice** Given $\angle M \cong \angle B$ and $\angle K \cong \angle C$, find the value of x .

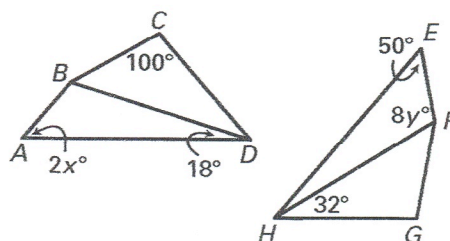


- (A) 43 (B) 40 (C) 82
 (D) 58 (E) 29

Quantitative Comparison In Exercises 7 and 8, use the given information to find the indicated value. Choose the statement below that is true about the given value.

- (A) The value in column A is greater.
 (B) The value in column B is greater.
 (C) The two values are equal.
 (D) The relationship cannot be determined from the given information.

Given: $ABCD \cong EFGH$



	Column A	Column B
7.	x	y
8.	$m\angle CBD$	$m\angle GHE$